Supporting Information

High-performance electron-transporting hybrid rylenes with low threshold voltage

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1, Thin-Film Absorptions of Compounds 3a-3d

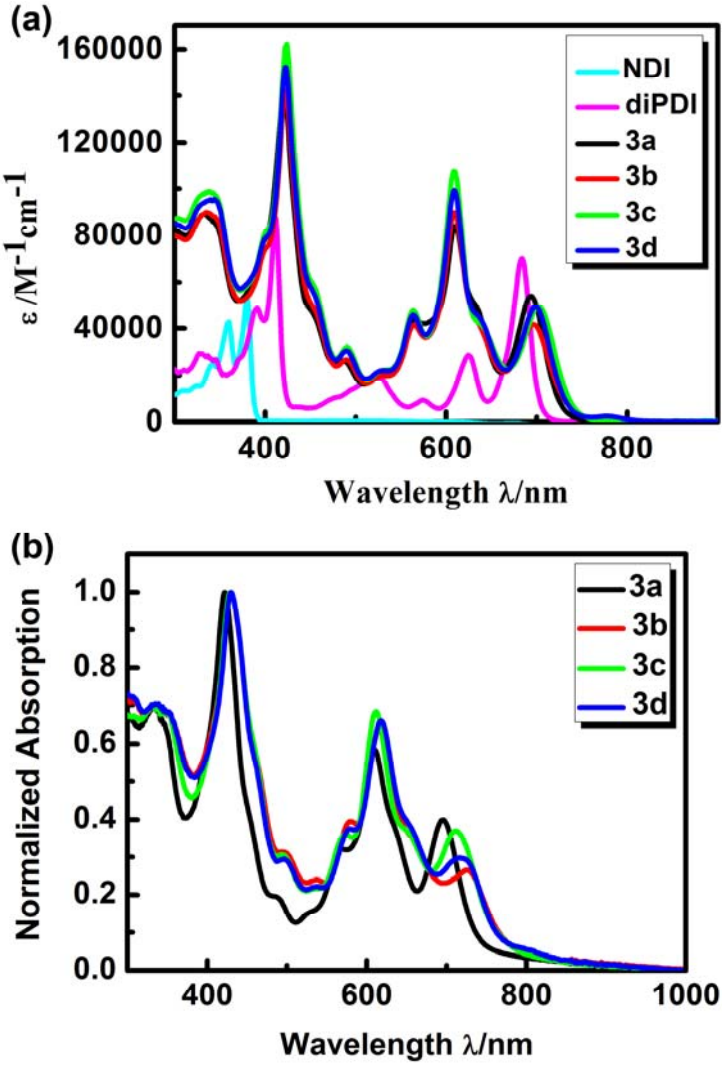


Fig. S1 (a) UV-vis absorption spectra of compounds NDI, diPDI, and **3a-3d** in $CHCl_3$ solution (1×10^{-5} mol/L, NDI: N,N′-di-n-octylnaphthalene-1,4,5,8-tetracarboxylic acid diimide, diPDI: N,N'-di(2,6-diisopropylphenyl)-perylene-3,4:9,10-tetracarboxylic acid bisimide). (b) Normalized absorption spectra of compounds **3a-3d** in thin films.

2, TGA of Compounds 3a-3d

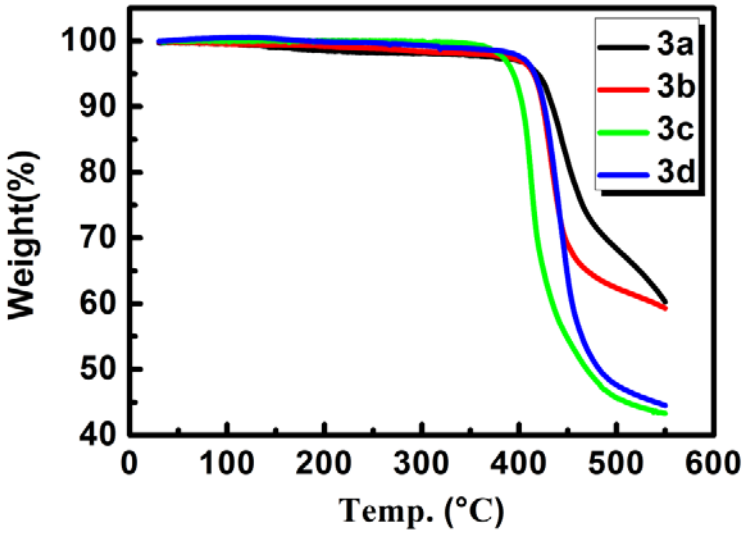


Fig. S2 Thermogravimetric analysis of compounds **3a-3d**

3, DSC of Compounds 3a-3d

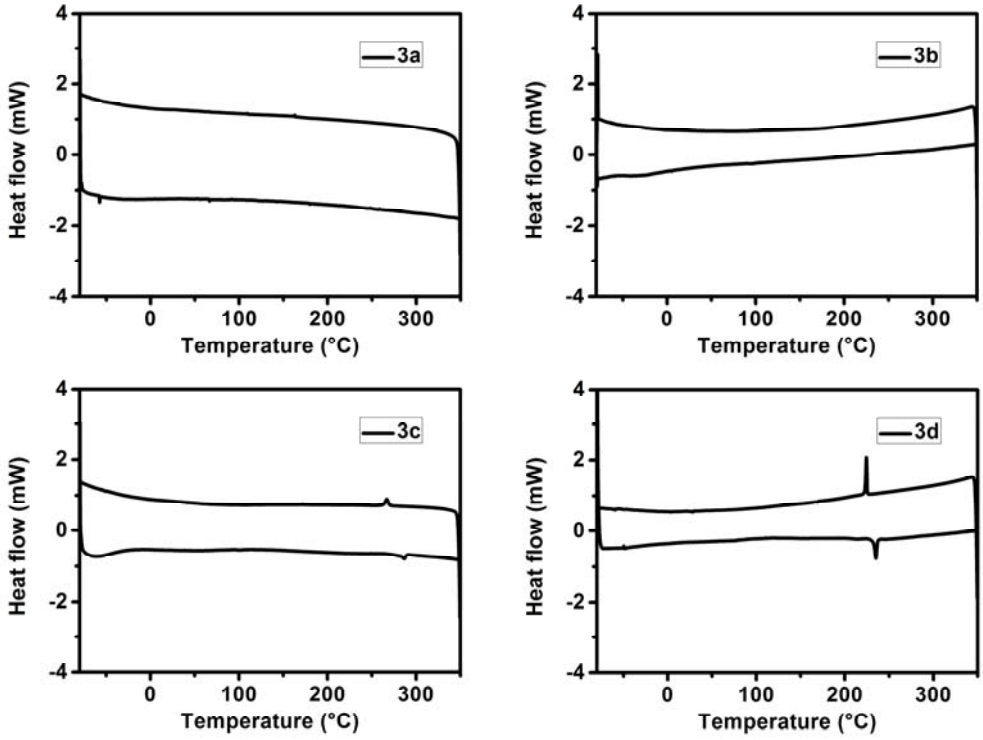


Fig. S3 Differential scanning calorimetry (DSC) curves of powder of compound **3a-3d** (Upward peaks indicate exothermic processes, while downward peaks indicate endothermic processes).

4, OFETs Characteristics of 3a-3d

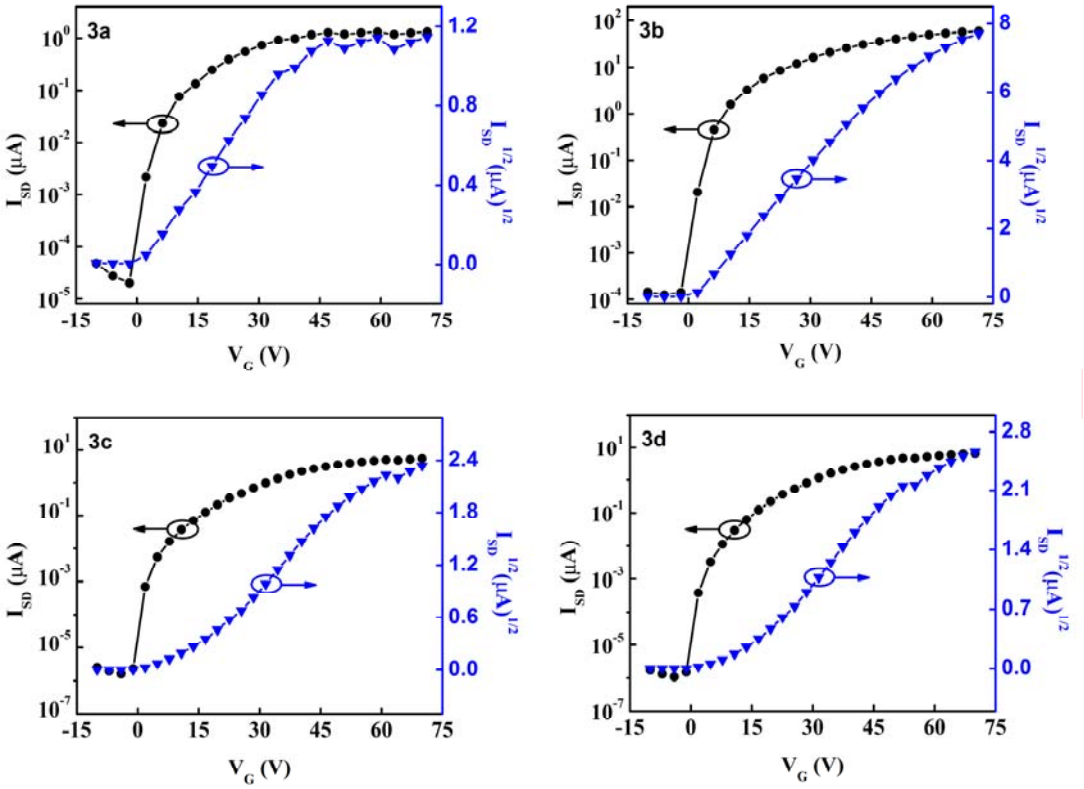


Fig. S4 Transfer curves of the best performing thin film transistor made from **3a-3d** at optimized annealing temperature in air (V_{sd} = 70 V), devices based on **3a**, **3b**, **3c**, and **3d** were fabricated by spin coating on OTS-treated Si/SiO_2 substrates annealed at 200, 240, 240, and 200 °C, respectively.

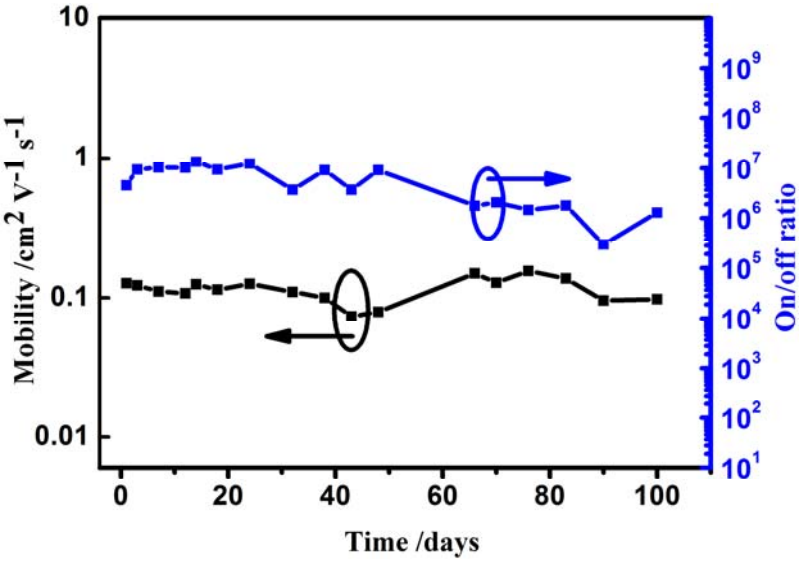


Fig. S5 Air-stability test of compound **3b** over a period of 100 days (annealed at 200 °C).

Table S1 Device performance of thin-film transisitors for compounds **3a-3d** at various annealing temperature in air.

Compounds	T [℃]	μ [$cm^2 V^{-1} s^{-1}$]	V_T [V]	I_{on}/I_{off}
3a	25	1.87×10^{-4}	3.72	6.75×10^{3}
	160	4.17×10^{-4}	0.58	2.58×10^{4}
	200	2.97×10^{-3}	0.35	6.52×10^{4}
	240	1.89×10^{-3}	18.1	7.55×10^{4}
3b	25	3.77×10^{-3}	1.27	2.01×10^{5}
	160	6.90×10^{-2}	-1.58	8.67×10^{5}
	200	1.25×10^{-1}	-3.69	4.11×10^{6}
	240	1.78×10^{-1}	0.95	5.49×10^{5}
3c	25	7.85×10^{-4}	-3.78	1.22×10^{5}
	160	9.20×10^{-3}	0.09	9.70×10^{5}
	200	1.44×10^{-2}	1.71	1.45×10^{6}
	240	5.44×10^{-2}	9.91	3.45×10^{6}
3d	25	4.53×10^{-3}	-1.78	6.11×10^{5}
	160	4.49×10^{-2}	3.03	5.56×10^{6}
	200	7.38×10^{-2}	11.6	6.07×10^{6}
	240	8.92×10^{-3}	4.70	1.43×10^{6}

5, AFM Images of 3a-3d

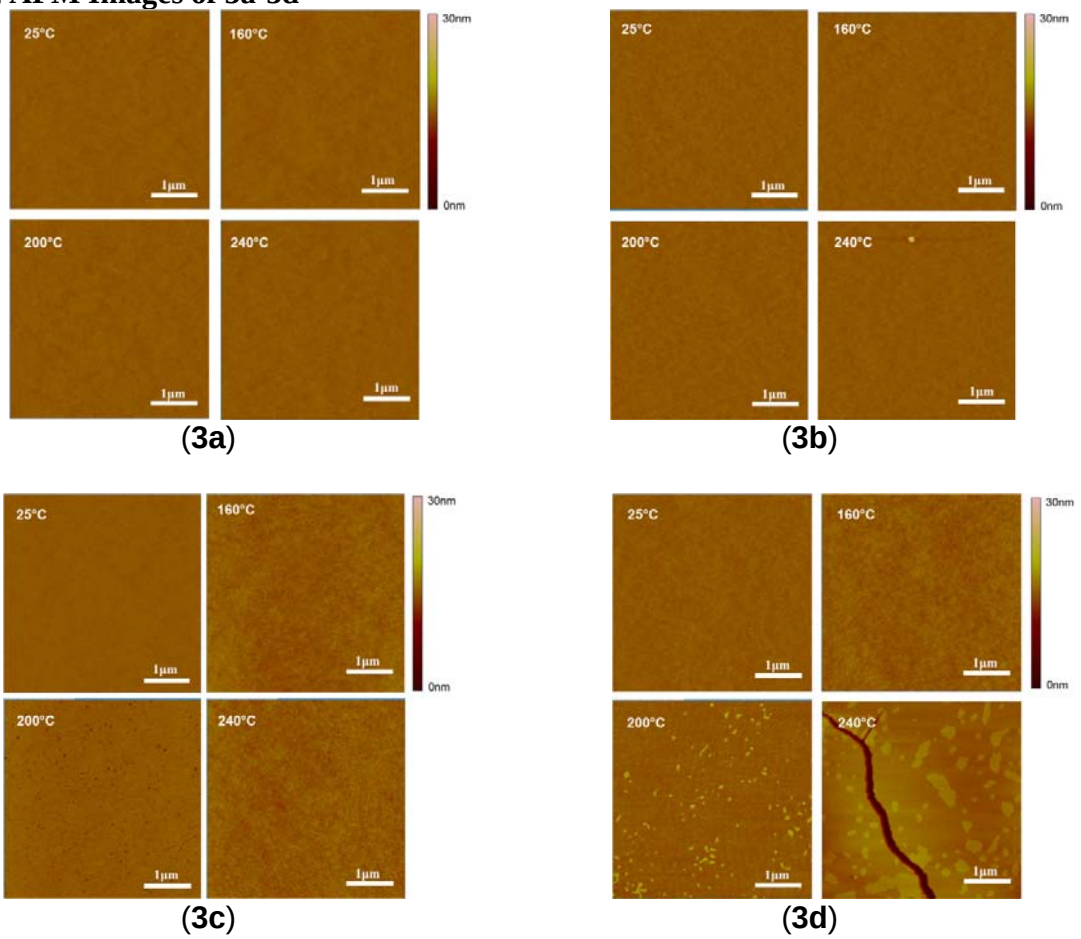
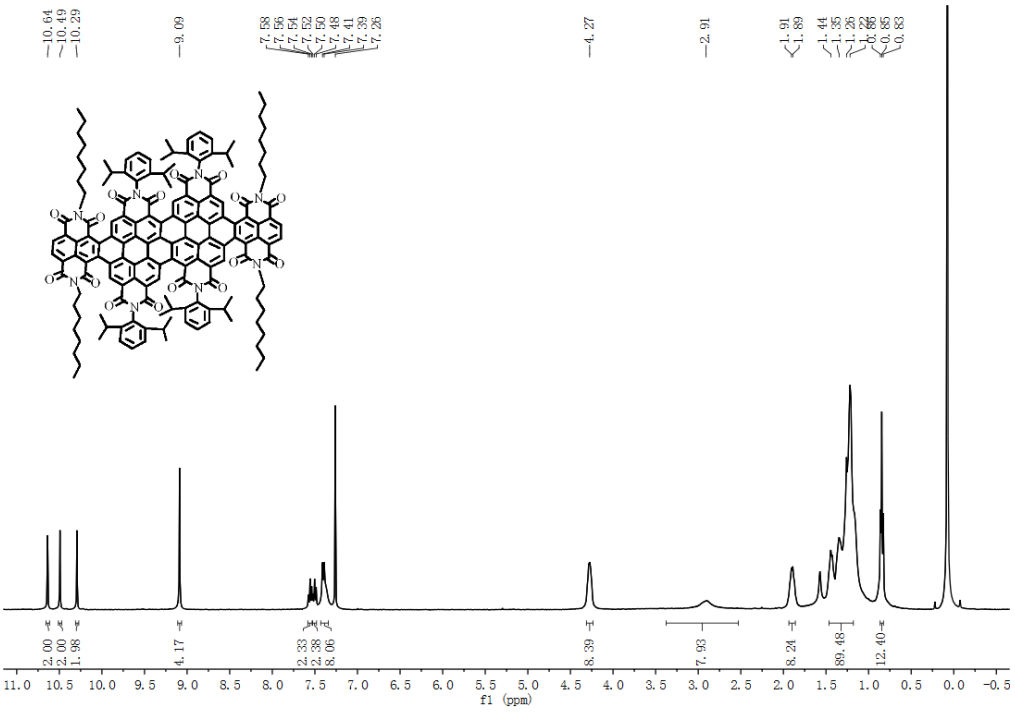


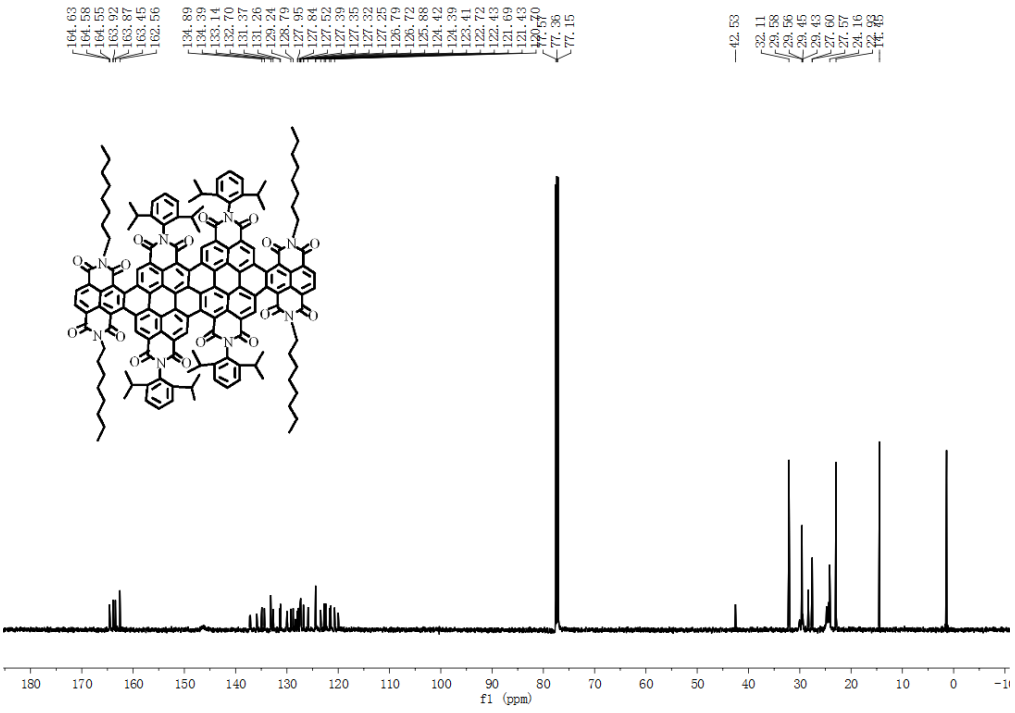
Fig. S6 AFM images (on OTS modified Si substrate with tapping mode) of thin film of **3a**-**3d** after annealing at various temperatures.

6, NMR and MS Spectra of Compounds 3a-3d

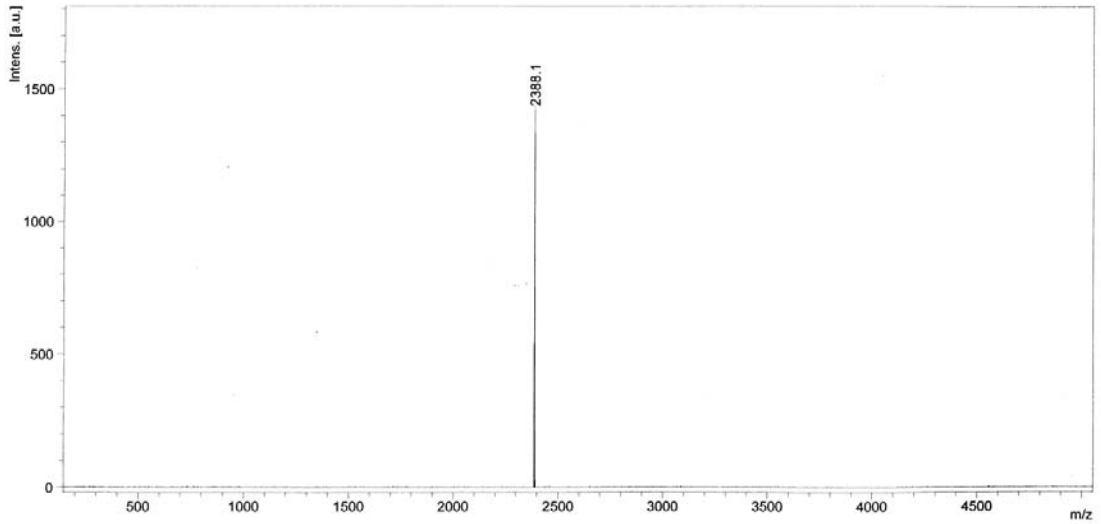
^{1}H NMR Spectrum of **3a** in $CDCl_3$ at 400 MHz

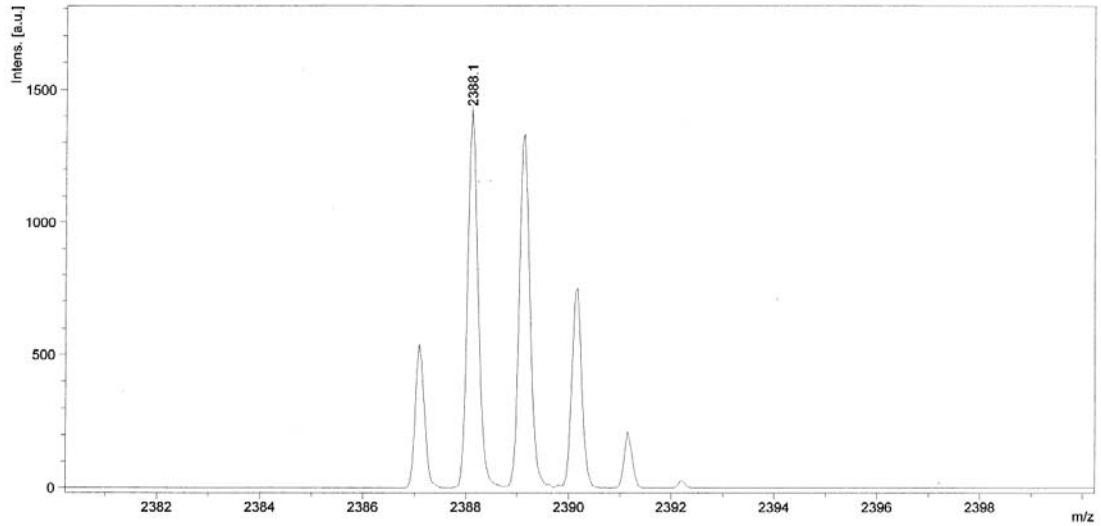


^{13}C NMR Spectrum of **3a** in $CDCl_3$ at 150 MHz

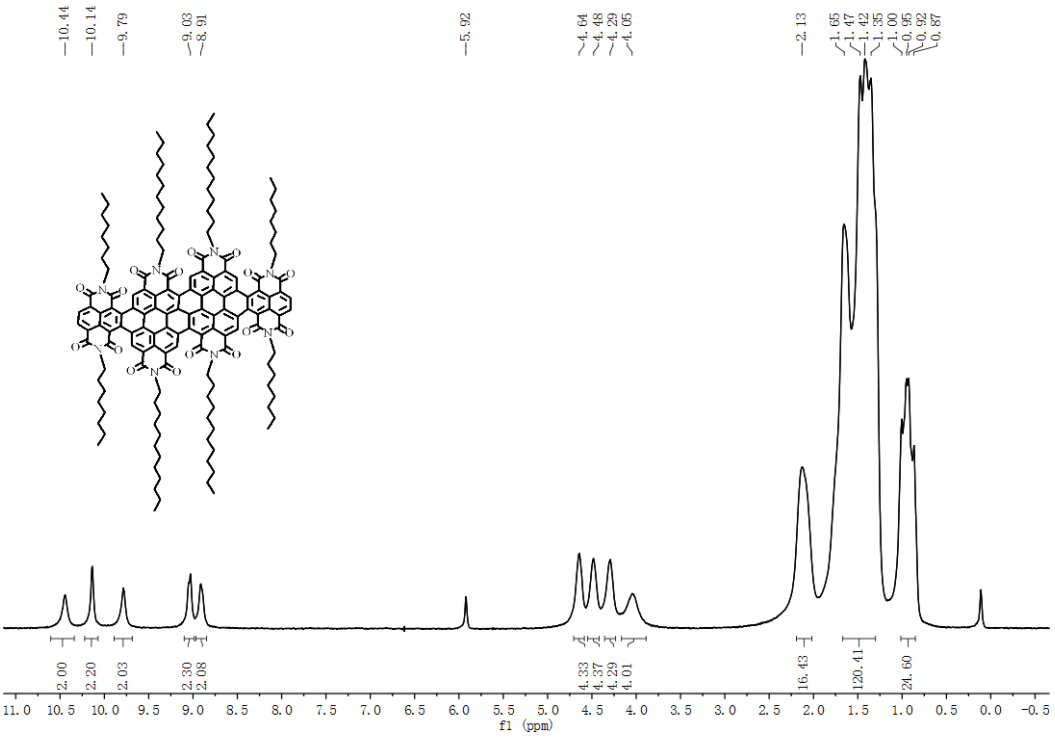


MALDI-TOF mass spectrum of **3a**

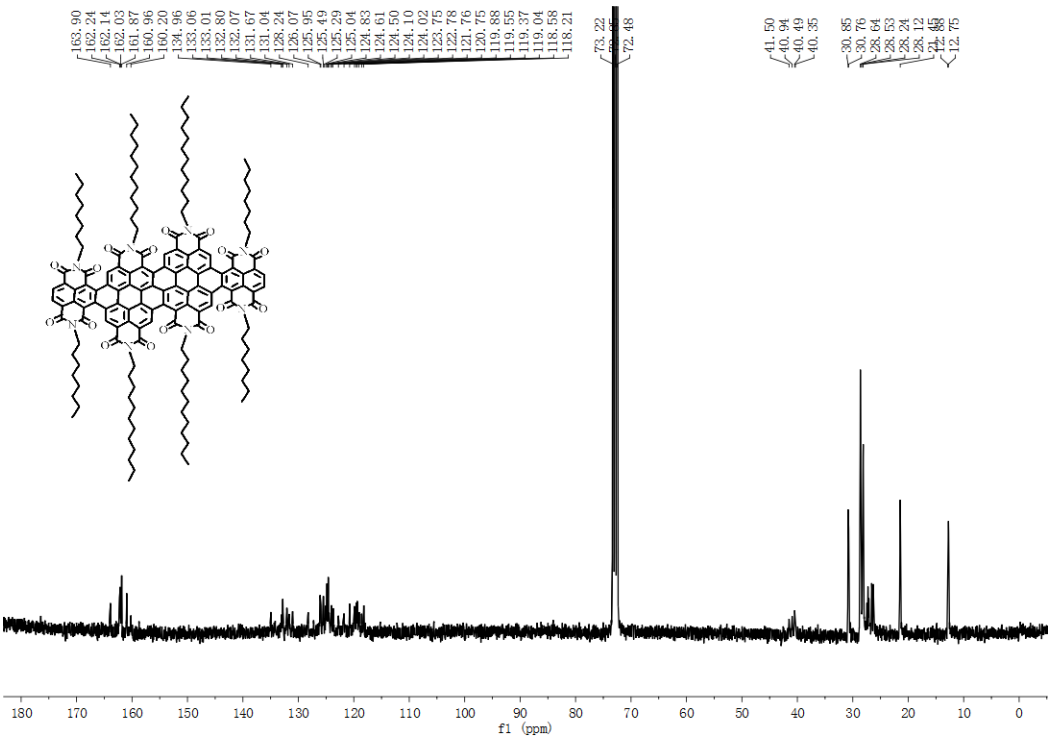




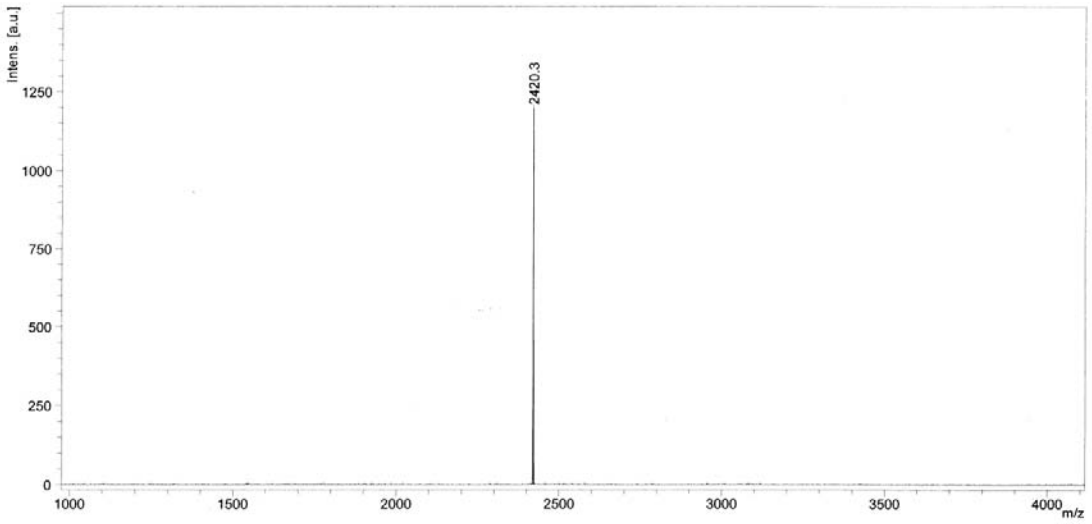
^{1}H NMR Spectrum of **3b** in 1,1,2,2-tetrachloroethane-d_2 at 300 MHz

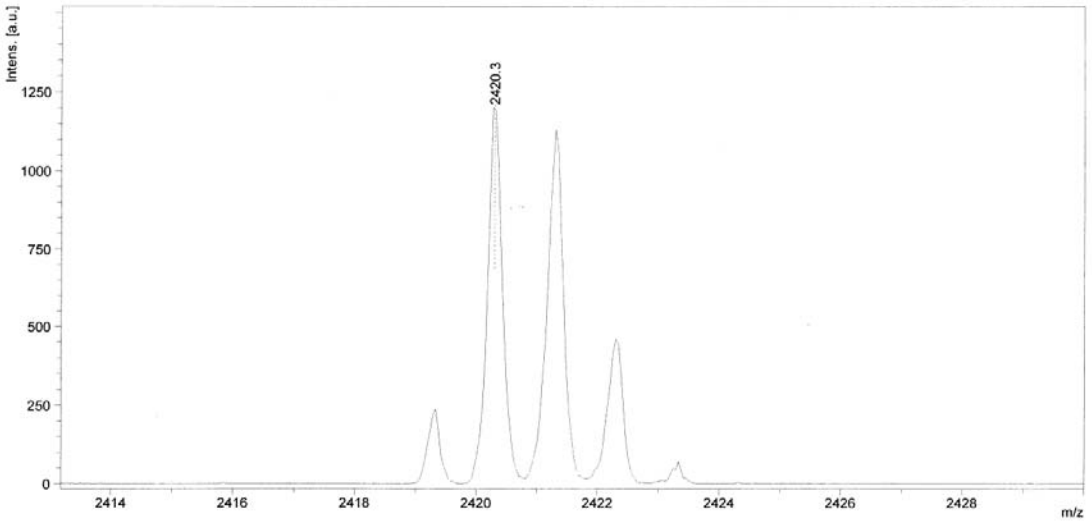


^{13}C NMR Spectrum of **3b** in 1,1,2,2-tetrachloroethane-d_2 at 75 MHz

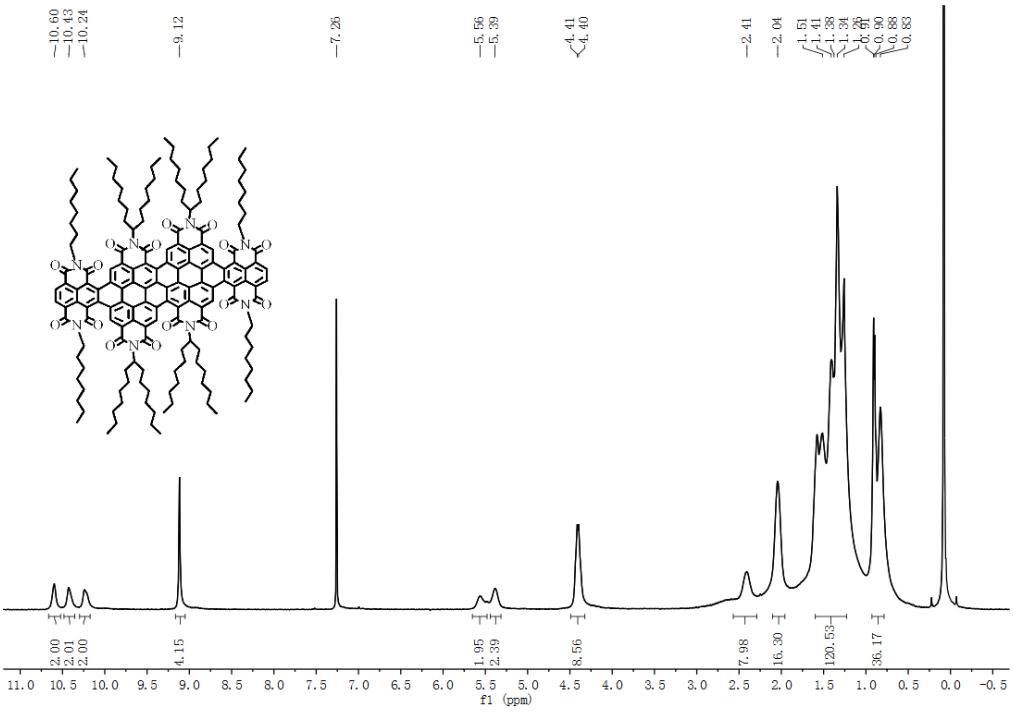


MALDI-TOF mass spectrum of **3b**

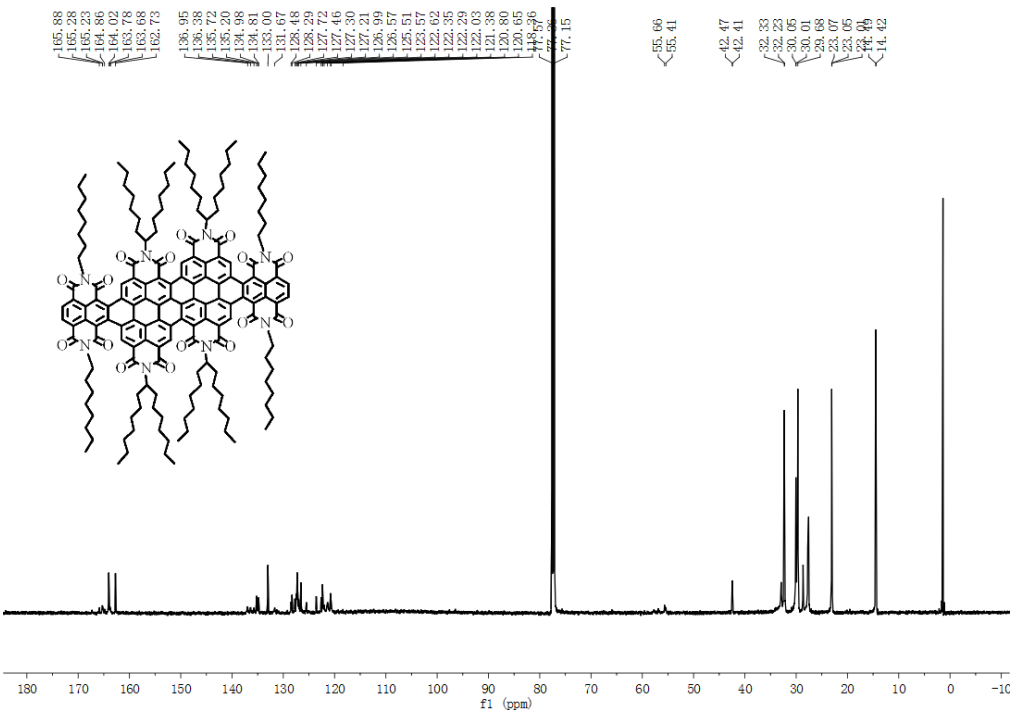




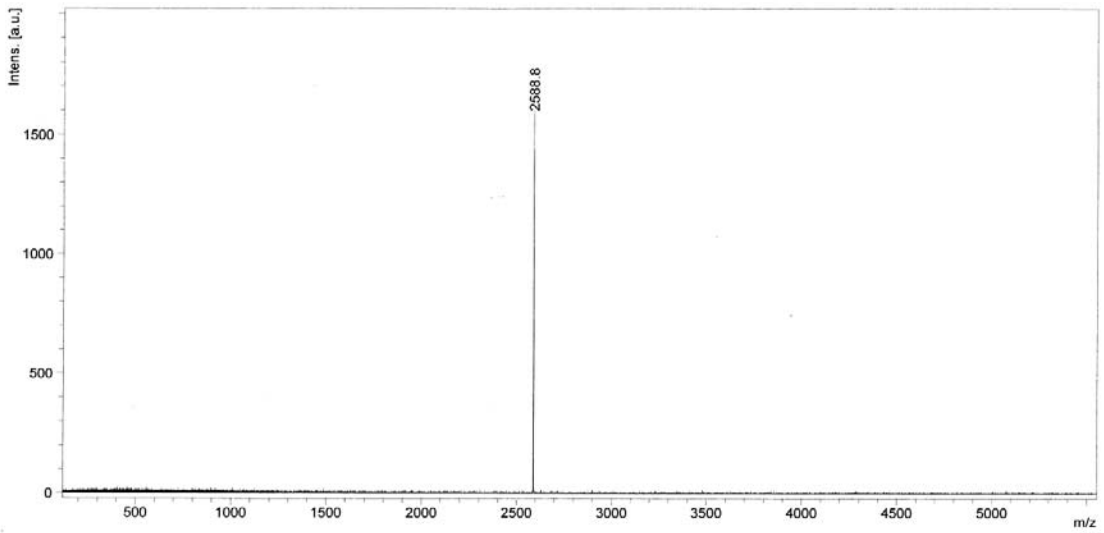
^{1}H NMR Spectrum of **3c** in $CDCl_3$ at 400 MHz

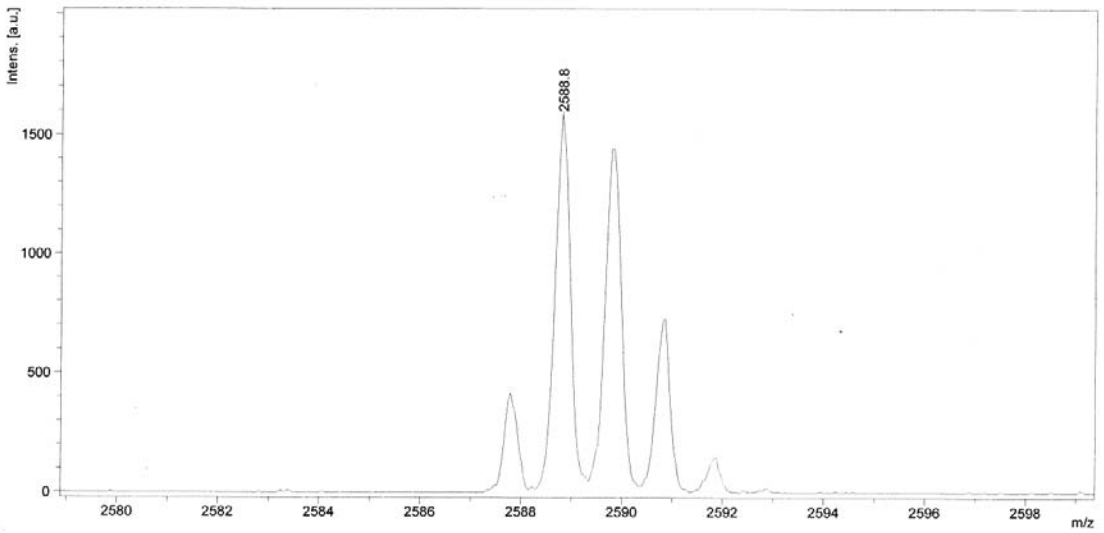


^{13}C NMR Spectrum of **3c** in $CDCl_3$ at 150 MHz

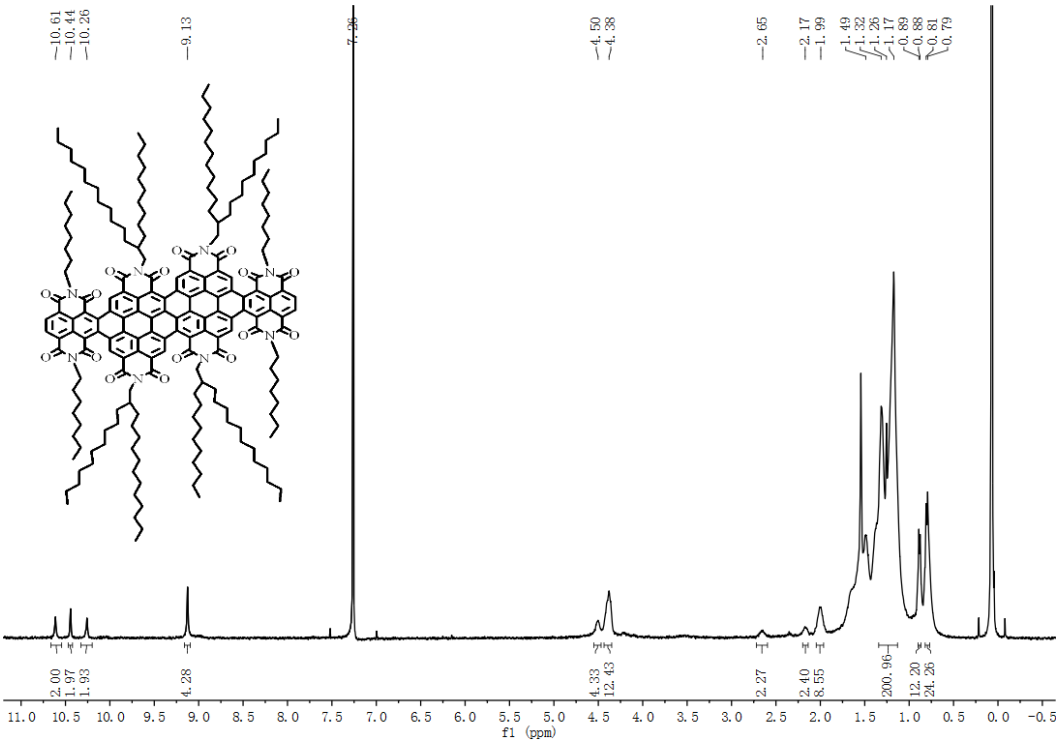


MALDI-TOF mass spectrum of **3c**

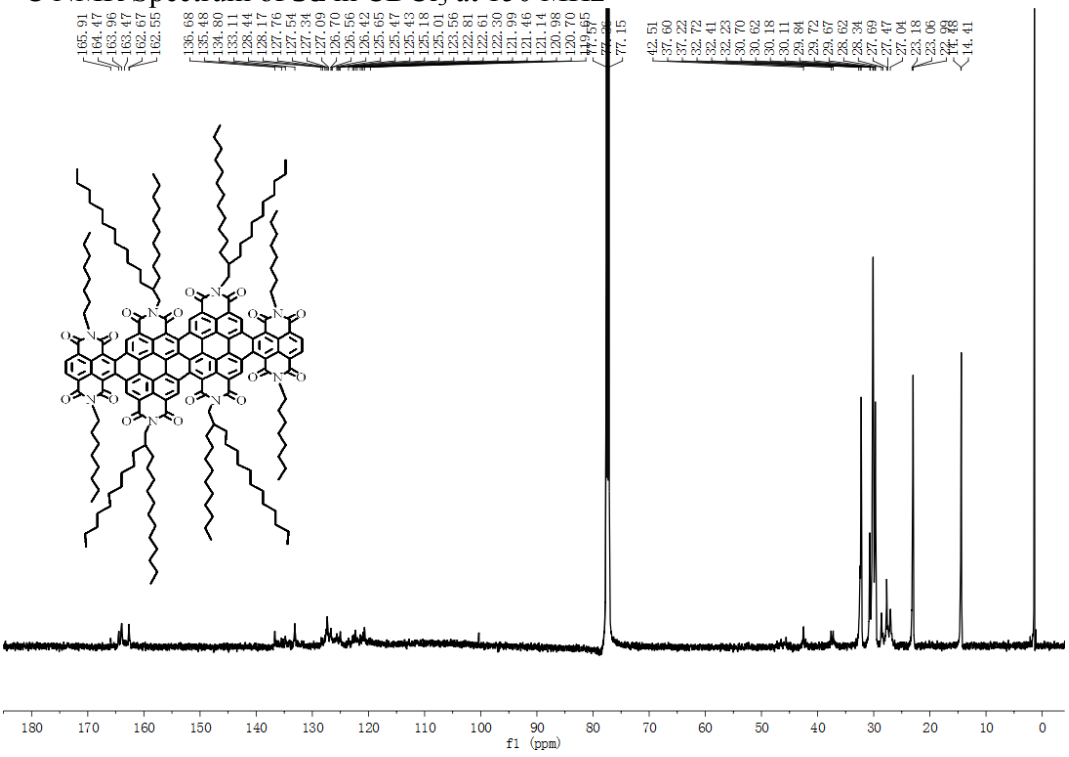




^{1}H NMR Spectrum of **3d** in $CDCl_3$ at 400 MHz



^{13}C NMR Spectrum of **3d** in $CDCl_3$ at 150 MHz



MALDI-TOF mass spectrum of **3d**